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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,927	02/02/2001	Hisaya Ishihara	NECN 18.304	3865
26304	7590	06/01/2005	EXAMINER	
KATTEN MUCHIN ROSENMAN LLP			KIM, KEVIN	
575 MADISON AVENUE			ART UNIT	
NEW YORK, NY 10022-2585			PAPER NUMBER	

2634

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/775,927

Applicant(s)

ISHIHARA, HISAYA

Examiner

Kevin Y. Kim

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3-28-2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3-28-2005 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 5-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim recites, among other things, "N frequency mixers cascaded from one another for mixing said oscillation frequency and said divided frequency or an output from a preceding one of said frequency mixers to output a first signal having a frequency equal to a sum of said oscillation frequency and said divided frequency or a frequency of another first signal output from said preceding one of said frequency mixers." However, the specification, specifically Fig.10 that appears to correspond to the claim, fails to support mixing the oscillation signal alternatively with "said

Art Unit: 2634

divided frequency” or “an output from a preceding one of said frequency mixers’ or “a frequency of another first signal output from said preceding one of said frequency mixers.”

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim recites, among other things, “N frequency mixers cascaded from one another for mixing said oscillation frequency and said divided frequency or an output from a preceding one of said frequency mixers to output a first signal having a frequency equal to a sum of said oscillation frequency and said divided frequency or a frequency of another first signal output from said preceding one of said frequency mixers.” This limitation is not understood as to the exact structure of or relations between the “oscillation frequency,” “divided frequency,” “first signal” and “another first signal output.” It appears that “or” used in the claim is a typographical error of “and,” which case would make the claim definite when read in light of Fig. 10. For the examination purposes, the claim is read as defining the structure illustrated in Fig. 10.

#### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

Art Unit: 2634

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4,9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art.

Claims 1,2, 9.

The admitted prior art (depicted in Figs. 3 and 5, and described at pages 3-8 of the present application) shows a quadrature modulator/method comprising:

- 1) a local oscillator (402) whose frequency  $f_{osc}$  is “ $4/(2N+1)$  times,” i.e.,  $4/3$  times where  $N = 1$ , of the carrier frequency  $f_{out}$ ,
- 2) a frequency conversion block (301 and 250) for multiplying the oscillating frequency by  $(2N+1)/2$ , i.e.,  $3/2$  where  $N = 1$ , see that the output of the frequency multiplier (250) is  $3/2 f_{osc}$
- 3) a first frequency divider (240) for dividing the output of the frequency conversion block by two to generate a pair of carrier waves, see the two output carrier waves from the frequency divider (240)
- 4) first and second multipliers (210 and 220) for modulating the two carrier waves with a digital baseband signal (101) and
- 5) an adder (230) for adding the two modulated carrier waves to output a digital carrier signal  $f_{out}$ ,

The claimed invention is different from the prior art in that its frequency conversion block includes “only one frequency divider for dividing the oscillation frequency by a factor of two” whereas the prior art has an additional frequency divider (350) for dividing the oscillation frequency by a factor of four. However, the function of the frequency conversion block of the

Art Unit: 2634

prior art is to provide " $3/2 f_{osc}$ " to the frequency divider (240). This frequency can be easily obtained by a frequency mixer that mixes the oscillation signal with an output of a single frequency divider of a dividing factor of two and bandpass filtering the mixed output, as is well known in the art. In other words, a frequency mixer produces the sum and difference frequencies of two input frequencies such that, when  $f_{osc}$  is mixed with  $f_{osc}/2$ , a sum frequency of  $3/2 f_{osc}$  results. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the prior art such that it would use only one frequency divider (310) which is mixed with the oscillation frequency to produce a sum frequency of  $3/2 f_{osc}$  for the purpose of using a less number of components in the frequency conversion block to achieve the same result.

Claim 3.

Since the frequency mixer produces the sum and difference frequencies, a bandpass filter is required to filter out the undesired difference frequency.

Claim 4.

A double balanced mixer is a commonly used type of a frequency mixer since it is known to have an improved distortion characteristics.

8. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Landefeld (US 3,644,827).

Claims 5 and 8.

The admitted prior art discloses all the subject matter claimed except that "N is equal to or more than "2" " and "N frequency mixers cascaded from one another" are used. However, a particular choice of N is an obvious matter of choice depending on what multiple of an

Art Unit: 2634

oscillation frequency is used as the carrier frequency in the prior art modulator shown in Fig.3 and 5. Landefeld discloses a combination of an oscillator (2) and a plurality of serially-coupled frequency mixers (24,30,34,38) to generate a desired frequency by selecting a sum frequency. Thus, a selective combination of a serially connected frequency mixers and an oscillator in the prior art QAM modulator would have been obvious to one skilled in the art at the time the invention was made for the purpose of generating any desired modulation frequency.

Claim 6.

Since the frequency mixer produces the sum and difference frequencies, a bandpass filter is required to filter out the undesired difference frequency.

Claim 7.

A double balanced mixer is a commonly used type of a frequency mixer since it is known to have an improved distortion characteristics.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2634

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

kvk

A handwritten signature in black ink, appearing to read "Chieh M. Fan", with a stylized flourish at the end.

**CHIEH M. FAN  
PRIMARY EXAMINER**